IPER ANNEX TRANSLATION

in a crash barrier, projections or recesses in a tunnel wall, lowered curb edges or the like. A number of solutions which can be combined with one another are proposed for filtering out such interference information:

For example a low pass filter can be provided for filtering out high frequency interference information. Such high frequency interference information is caused, for example, by the vehicle moving at a high velocity along a tunnel wall and the tunnel wall having a narrow projection. However, a high pass filter is also advantageous for filtering out low frequency interference information. Such low frequency interference may be caused, for example, by a vehicle which is overtaking the vehicle configured according to the invention at a low relative velocity.

Plausibility checking is also preferred. During plausibility checking, for example different distance data from a plurality of distance sensors are evaluated. If the distance data of one sensor differs from the distance data of the other distance sensor significantly, this differing distance data is filtered out.

A further preferred variant provides for the lane data or the distance data to be compared with stored lane data. The stored lane data extracts the lane device according to the invention from a digitized road map, for example.

The distance sensor preferably operates in a range of invisible or inaudible frequencies. In particular, using invisible frequencies has the advantage

The tunnel walls 62, 64 form reference bodies which run essentially continuously. However, there may also be discontinuities, for example the wall projection 63 which has already been mentioned. If the vehicle 10 travels past the projection 63, the distance sensor 59 which lies at the front in the travel direction transmits distance data 61, and then the distance sensor 59 located at the rear in the travel direction transmits distance data 61, said distance data 61 containing the relatively short distance d1. This short term or high frequency change in the distance data 61 is filtered a high pass filter 31 out of the distance data 61 by a low pass filter 31. The low pass filter 31 is contained in an input filter 32 of the lane module 30. The filter 32 also contains tracking means 34 which are effective in addition to or instead of the low pass filter 31. For example, the tracking means 34 determine that the distance d1 differs significantly from the distances d2 which are otherwise measured by the distance sensors 59, and accordingly fades out the distance data 61 containing the distance d1.

The optical detection system 40 orientates itself, for example, with one of the carriageway markings 42 which divide the carriageways 13, 16 from one another.

Converting means 35 convert the distance data 60, 61, 66 into lane data 36 which characterizes the carriageway 13 and/or the lane 15. To this extent, the conversion means 34 and the lane module 30 can be referred to as evaluation means for evaluating distance data.

Plausibility means 37 check the lane data 36 for plausibility by means of stored lane data 45. For example, the plausibility means 37 will receive, from a navigation system 43, data about a course of a carriageway which

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Patent Claims

1. A lane device for detecting the lane of a vehicle (10, 11, 12), the lane device (30) having evaluation means (32, 34, 37) for evaluating distance data (60, 61, 66) of at least one distance sensor (58, 59, 65), the distance data (60, 61, 66) containing information about a distance (d1-d4) from a reference body (62, 64) which runs essentially continuously to the side of the lane, at least in sections, and the evaluation means (32, 35, 37) being configured to acquire lane data (36) as a function of the distance data (60, 61, 66), characterized in that the evaluation means (32, 35, 37) filter out interference information, caused in particular by vehicles (17) present in the region of the lane or discontinuities (63) of the reference body (62, 64), from the distance data (60, 61, 66), the lane data (36) being acquired as a function of the filtered distance data (60, 61, 66).

2. The lane device as claimed in claim 1, characterized in that it contains at least one high pass filter and/or at least one low pass filter (31) for filtering the distance data (60, 61, 66).

3. The lane device as claimed in claim 1 or 2, characterized in that it carries out plausibility checking for the filtering of the distance data

4. The lane device as claimed in one of the preceding claims, characterized in that the evaluation means (32, 35, 37) compare the lane data (36) and/or the distance data (60, 61, 66) with stored lane data (45).

5. The lane device as claimed in one of the preceding claims, characterized in that the distance sensor (58, 59, 65) operates in a range of invisible or inaudible frequencies.

6. The lane device as claimed in one of the preceding claims, characterized in that the at least one distance sensor (58, 59, 65) is an ultrasonic sensor, a radar sensor or an infrared sensor.

7. The lane device as claimed in one of the preceding claims, characterized in that it can be activated, or activates itself, when there is an operative failure of a wirefree locating system, in particular of an GPS system (41), and/or where there is an operative failure of an optical detection system (40).

8. The lane device as claimed in one of the preceding claims, characterized in that the at least one distance sensor (58, 59, 65) forms a component of the lane device (30).

9. The lane device as claimed in one of the preceding claims, characterized in that the at least one distance sensor (58, 59, 65) forms a component of a parking aid device (28).

10. The lane device as claimed in one of the preceding claims, characterized in that it evaluates the distance data (60, 61, 66) of the at least one distance sensor (58, 59, 65) as a function of the velocity (vl) of the vehicle (10, 11, 12).

11. The lane device as claimed in one of the preceding claims, characterized in that it evaluates, and in particular weights, the distance data (60, 61, 66) as a function of the position of the at least one distance sensor (58, 59, 65) on the vehicle (10, 11, 12).

12. The lane device as claimed in one of the preceding claims, characterized in that it is configured to perform a transverse control of the vehicle (10, 11, 12), in particular to generate a steering intervention in the vehicle (10, 11, 12).

13. A selector device for interaction with a parking aid device (28) and with a lane device (30) as claimed in one of the preceding claims, having selection means for selecting the distance data (60, 61, 66) of the at least one distance sensor (58, 59, 65) as a function of the velocity of the vehicle (10, 11, 12) for the parking aid device (28) and/or for the lane device (30).

14. The selector device as claimed in claim 13, characterized in that the selection means is configured to make a direction-dependent selection of the distance data (60, 61, 66) of at least two distance sensors (58, 59, 65) as a function of their position on the vehicle (10, 11, 12).

15. The selector device as claimed in claim 13 or 14, characterized in that it forms a component of the lane device (30) or of the parking aid device (28).

16. The lane device as claimed in one of claims 1 to 12 or selector device as claimed in one of claims 13 to 15,

characterized in that it has program code which can be executed by a processor (25).

17. A storage means having a lane device and/or a selector device as claimed in claim 16.

18. A vehicle, in particular a passenger car, characterized in that it has a lane device (30) as claimed in one of claims 1 to 12 or 16, or a selector device (29) as claimed in one of claims 13 to 16, and/or a storage means as claimed in claim 17.

19. A use of a distance sensor (58, 59, 65) which is a component of a parking aid device which is arranged in a vehicle (10), for providing distance data (60, 61, 66) which is fed to a lane device (30) as claimed in one of the preceding claims which is also arranged in the vehicle (10), the lane device (30) acquiring lane data (36) from this distance data (60, 61, 66) in order to determine a lane (15) along which the vehicle (10) is guided.

20. A method for detecting the lane of a vehicle (10, 11, 12), having the following steps: evaluation of distance data (60, 61, 66) of at least one distance sensor (58, 59, 65), the distance data (60, 61, 66) containing information about a distance (d1-d4) from a reference body (62, 64) which runs essentially continuously to the side of the lane, at least in sections, and acquisition of lane data (36) as a function of the distance data (60, 61, 66), characterized in that interference information, caused by vehicles (17) present in the region of the lane or discontinuities (63) of the reference body (62, 64), are filtered out from the distance data (60, 61, 66), the lane data (36) being acquired as a function of the filtered distance data (60, 61, 66).